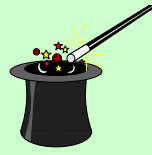


# WHAT'S HAPPENIN'



*The Iowa Geological Survey's Geographic Information Systems Bi-Monthly Section Newsletter*

The Iowa Geological Survey's GIS Section continues its efforts to better inform users of GIS data of changes, updates and new datasets. This month's edition of "What's Happenin'" will do a follow-up on the last issues' article on Drainage Basins by looking more in depth at the *Watershed Atlas* and other Internet Map Servers put out by the IGS and DNR. The *Watershed Atlas* article draws on information from a publication on Interactive Mapping put out by the Communications Bureau of the IDNR. The other article will focus on a Statemap project that is mapping surficial characteristics of the Des Moines Lobe. Finally, a progress report of sorts will be presented regarding some of the projects that have been presented in past issues. Please address questions, concerns, or suggestions to Chris Kahle at [ckahle@igsb.uiowa.edu](mailto:ckahle@igsb.uiowa.edu), or Andy Asell at [aasell@igsb.uiowa.edu](mailto:aasell@igsb.uiowa.edu).

## *Watershed Atlas*

After having been publicly available online for just over a year the *Watershed Atlas* is starting to become a popular site. From Internet Map Server (IMS) site statistics we know that the total hits in July of 2003 were 114. Compare this to the July 2004 total hits of 2,560. Unique visitors in July of 2003 totaled 45, in July of 2004 this number rose to 1,517. These are huge jumps in use by public and private investigators of watershed information. The jump is primarily due to the attempts of Cam Conrad and other DNR staff to get the word out. Cam, in particular, has been active by attending various meetings and expositions and giving demonstrations of the *Atlas*.

Public presentations are only one reason that the use of the *Watershed Atlas* has risen. The overall ease of use and general applicability of what is on the *Atlas* is also a major contributing factor.

Among the main advantages to users are the following: The interactive nature of the DNR's online maps allows users to view maps showing as much or as little information and detail as they want. The *Watershed Atlas* allows users to view color infrared aerial photography, topographic maps and geographic features, including Iowa's many watersheds. The *Atlas* can also display maps of elevation, potential soil loss, percent slope, corn suitability ratings, hydric soil and land cover, among others. The *Atlas* displays impaired streams and lakes in Iowa and allows users to link from specific water bodies to data from the Iowa Lakes database, managed by the Iowa State University Limnology Laboratory.

Possibly the greatest advantage to using the *Watershed Atlas* is that it allows users to access a large amount of information for free online without special software. This is one of the main reasons that the IDNR originally started trying to create IMS

applications. So much information had been developed, yet the public and other users were not able to view it without purchasing software. In order to get information out to the public this seemed an obvious choice.

### **Who is using it?**

The *Watershed Atlas* is a great tool for employees of the DNR along with many sectors of the population including those involved with agriculture, policy makers, educators and recreation enthusiasts.

DNR employees can do preliminary investigating before going into the field, saving time and ultimately money. For instance, a member of the public could establish a CAFO or AFO. Working by themselves or with a DNR employee from the AFO section, they could see what potential drainage issues exist on the property. The employee could see whether this proposed structure was encroaching on an impaired stream, where detention structures would be most effective, where soil characteristics were an issue and ultimately determine the best possible location for the facility, along with alternative locations if necessary.

### **How is the public using this tool?**

#### **Agricultural**

Drawing from the previous example it is easy to see that the *Watershed Atlas* has a number of possible agricultural uses. Mapping a property with color infrared photography (CIR) and soil data information can help determine the need for conservation practices and can be used to collect information for manure management plans. Logging potential can be estimated using CIR and percent slope to see if wooded areas are accessible and Forest Reserve Exemption tax credits could also be derived by observing the percentage of property covered by forests. Besides these utilitarian functions a farmer can survey their land to see how their property is related to surrounding properties, giving a better overall understanding of what is going on to contribute to the quality of the property.

#### **Policy making**

The *Watershed Atlas* is a great tool for policy makers. Decision makers can find the information they need to make an educated choice with maps that cover a range of topics. Before approving projects, or while researching potential impacts of a project, researchers can draw on a wealth of informational maps and datasets developed by the IGS's GIS section, the DNR and other State and Federal agencies. As usage increases, it may help create awareness about watershed health and impacts of future projects.

As IMS becomes more accepted and funded, datasets will become more integrated, offering even more potential for analysis. For example overlaying well sites with other info such as USTs, livestock burial zones and soil types might show project impacts on drinking water of a nearby population. This information could therefore be used when addressing issues of development and land use planning.

#### **Education**

Our future is in our hands, our children need to learn to think this way as well. Having a dataset like this easily available to the youth of today will help to teach them that there are interrelationships and that our actions do effect others. The interrelatedness of the cycle of water, as well as the cycle of earth's processes can be shown by giving an

understanding of how something a few miles away or on the opposite side of the state can relate to what is going on in their part of the world.

### **Recreation**

For recreational purposes the *Watershed Atlas* can be used as a basic map and air photography viewer. With a destination in mind, anglers, hunters and recreational hikers can print off maps of the area. They can look at CIR or topographic maps and know what to expect when they get there. They can also plot out points and get lat/long coordinates for places of interest or places to hunt or dock/fish. If a user has a GPS device they can plot out routes for their recreational activity, or by taking points from out in the field find out exactly where on earth they might have been when they came across a point of interest out in the middle of the woods. They could also see what might be influencing that site hydrologically, geologically or geographically to make it unique.

### **Beyond the Watershed Atlas**

The DNR already has a number of IMS applications that can be accessed through the link [www.iowadnr.com](http://www.iowadnr.com), and clicking on “Mapping (GIS Interactive)”. These are the *Basic Map and Photography Viewer*, *Species at Risk*, *Livestock Burial Zones*, *Watershed Education*, *Water Monitoring* and *Geosam*.

*Water Monitoring* and *Geosam* are two of the veteran IMS applications that have been served out on the web by the Water Quality Monitoring Section of the Iowa Geological Survey since 2003. These deal with specific interests. *Water monitoring* incorporates IOWATER and IASTORET sampling data with other water quality data provided by Federal, State, Local Government and private sources. *Geosam* deals with geological attributes of wells derived from well logs. *Geosam* has had it’s records served out on the web for over 5 years, and in 2003 *Geosam* incorporated IMS.

Another veteran site worth mentioning is the *Underground Storage Tank* site. The UST staff of the Land Quality Bureau developed the UST\_site IMS with IGS staff, which came online in 2002. This shows where Underground Storage Tanks and Leaking Underground Storage Tanks are located. Again this is a great tool for decision makers, showing where areas of concern are related to USTs. This site incorporates much of the information contained in the *Watershed Atlas*, but is focused on USTs. The UST IMS can be accessed at: [http://igsims.igsb.uiowa.edu/website/ust\\_sites/default.htm](http://igsims.igsb.uiowa.edu/website/ust_sites/default.htm)

### **Contact Information**

The contact for the *Watershed Atlas* is Cam Conrad, he has worked to help develop the site and has been the main representative at many public demonstrations of the Atlas. Questions regarding the site and its use should be directed to him. He can be reached via email at [Cam.Conrad@dnr.state.ia.us](mailto:Cam.Conrad@dnr.state.ia.us), or by phone at (515) 281 – 5843.

## Surficial Geology of the Des Moines Lobe: Emmet and Dickinson Counties

It is a November morning and the wind is whipping over the undulating plains of Emmet County. IGS Geologist Deb Quade trudges through corn stubble carrying a five foot long plastic tube of fresh core under her arm. She slides the core, a tube of glacial till, onto the bed of her truck and with a partially frozen magic marker labels the upper and lower depths of core. She then stops to inspect the soil protruding from the bottom of the tube. She inspects the core sample, as does colleague Mark Minger, a soil scientist with the Natural Resources Conservation Office in Storm Lake. Minger has joined Quade to describe the soil profile from each core and for an unusual opportunity to view core collected from depths much greater than six to ten feet. Quade and Minger observe the color, texture, effervescence (technique used to detect the presence of carbonates) and other noticeable properties of the sediments, recording these observations into a field notebook. Now, the core tube is capped and will be transported back to Iowa City for a more thorough description later in the winter. Quade warms herself up with a quick swig of coffee, punches at the screen of her palm pilot to insure her GPS has locked onto enough satellites to record her position, and then walks back towards the drill rig to grab another core. At this point in the year most people are content staying inside and fiddling with their thermostats, but for Quade it's one of the busiest times of the year. The partially frozen ground and the harvested crop fields make it the perfect time of year to talk with farmers and ask about acquiring access to farm ground. With the crops harvested, Quade can now see subtle glacial landforms which were earlier obscured by row crops on Des Moines Lobe.

The Des Moines Lobe landform region is the most recently glaciated area of the State, a landscape characterized by a fairly low relief landscape dotted with numerous closed depressions (potholes). This youthful landscape has not been subjected to several hundred thousand years of erosion which carved the steep hills and dendritic drainages of southern Iowa. To the untrained eye this region appears to be an extensive, homogeneous plain of cropland and rich soil. In actuality, this region is a highly complex suite of subtle glacial landforms and deposits that have major implications on the hydrology, water quality, agricultural practices, and economic development of the state.

### **Past Research of the Des Moines Lobe**

Des Moines Lobe ice advanced into Iowa approximately 15,000 years ago. A small, relatively thin lobe of ice (maybe a mile thick) surged into the state, from a massive continental glacier that was positioned over the Upper Midwest and much of Canada. The Des Moines Lobe ice flowed down a regional low, through the Dakotas, across Minnesota reaching its terminal position at Des Moines around 14,000 years ago. During the next several thousand years a handful of readvances occurred culminating in the final readvance of the Des Moines Lobe approximately 12,500 years ago.

It wasn't until the mid to late 1800s when geologists began to consider continental glaciation as a process that might explain the baffling landforms found throughout the northern hemisphere. As this idea slowly gained acceptance geologists soon recognized that large areas of the Midwest had been glaciated in the past, and that in areas of Iowa the signs were still very fresh.

As with any burgeoning science, the general concepts of glacial geology formed very rapidly. These initial concepts were formed by observations made from glacial deposits found in the mountainous regions of Europe and North America. Many of the deposits and landforms found in these regions owe much of their character to processes that occur beneath a glacier, or subglacial processes. Operating on the hypothesis that the Des Moines Lobe was formed by an active glacier, geologists concentrated on the delineation of morphologic features, end moraines and the ground, and less time on regional study of the sediment package.

This approach dominated research regarding the Des Moines Lobe from the late 1800s and through the 1960s. This hypothesis combined with the advent of radiocarbon dating occurred in the 1950s and the subsequent study of palynologic (pollen) and entomologic (insects) data found within glacial tills allowed researchers to reconstruct the environment during the Des Moines Lobe glaciation. Pollen and fossil beetle studies indicated the climate was relatively temperate during glaciation rather than the harsh, tundra environment envisioned by earlier geologists. In fact, many of the flora and fauna species studied are still found today, but in rather temperate environments similar to the boreal forests found to our north.

In the early 1980s, the IGS adopted the current rock stratigraphic classification system utilized for Des Moines Lobe sediments (Kemmis et al., 1981). This lithostratigraphic framework is incorporated into the current mapping strategy which utilizes landform sediment assemblage mapping. This concept is based on mapping relief patterns, sediment packages and stratigraphy. It is the recognition of the genetic relationship among landforms and the underlying sediment package that allows mappers to generalize complex glacial terrains into readily identifiable map units.

### **Mapping the Des Moines Lobe via the STATEMAP Program**

Quade's efforts to revise the surficial geology map of the Des Moines Lobe are funded in part by the federal STATEMAP Program. This program is a competitive grant program funded by the USGS that awards state geological surveys a one-to-one funding match for mapping projects that establish geological datasets (digital geologic maps) that benefit the economic, social or scientific welfare of the participating states. For the last decade, IGS has utilized funding from the STATEMAP Program to update maps of the state's bedrock geology (August '04, Newsletter 3) and the surficial geology of urban areas and transportation corridors in addition to the Des Moines Lobe.

The recently completed surficial maps of Emmet and Dickinson Counties mark the twelfth and thirteenth counties of the Des Moines Lobe that have been developed through the STATEMAP Program since 1999 (figure 1). The most significant aspect of this renewed effort to revise the surficial geology of the Des Moines Lobe is that the final products will not only describe sediment packages stratigraphically and temporally, but also correlate these packages to the depositional landforms in which they are found.





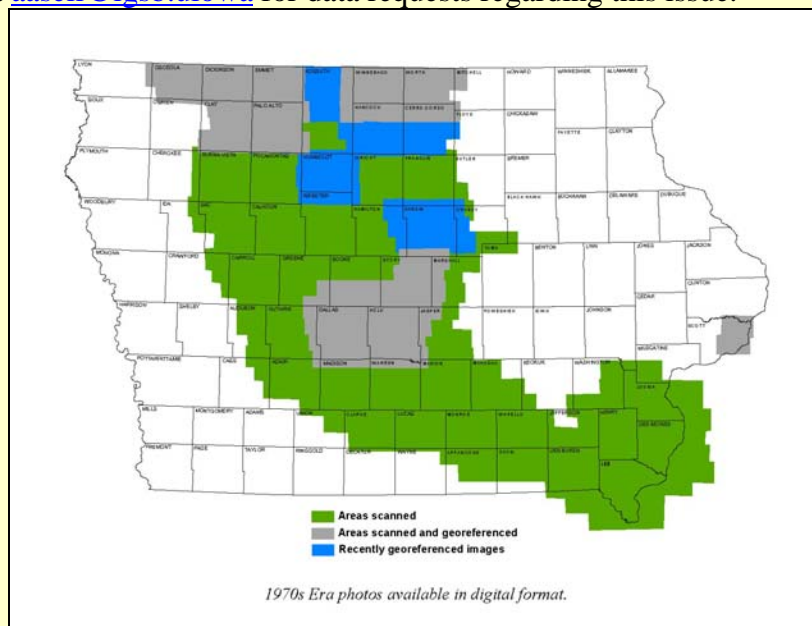
<b>OFM-99-1</b>	Overview of the Surficial Geologic Map of the Des Moines Lobe of Iowa, Phase 1: Hancock, Kossuth, Winnebago and Wright counties, Iowa, D. J. Quade, J. D. Giglierano, E. A. Bettis III, and B. E. Hoyer, 1999, scale 1:100,000, 22 p. <a href="#">[Pdf]</a>
<b>OFM-00-1</b>	Overview of the Surficial Geologic Map of the Des Moines Lobe of Iowa, Phase 2: Hamilton and Webster counties, Iowa, D. J. Quade, J. D. Giglierano, E. A. Bettis III, and R. J. Wisner, 2000, scale 1:100,000, 22 p. <a href="#">[Pdf]</a>
<b>OFM-01-1</b>	Overview of the Surficial Geologic Map of the Des Moines Lobe of Iowa, Phase 3: Boone and Story counties, D. J. Quade, J. D. Giglierano, E. A. Bettis III, and R. J. Wisner, 2001, scale 1:100,000, 25 p. <a href="#">[Pdf]</a>
<b>OFM-02-2</b>	Surficial geologic map of the Des Moines Lobe of Iowa, Phase 4: Dallas County, D. J. Quade, J. D. Giglierano, E. A. Bettis III, and R.J. Wisner, 2002, scale 1:100,000, supported by Cooperative Agreement 010-HQAG-0091, September 2002. <a href="#">[Pdf]</a> <a href="#">[Map discussion]</a>
<b>OFM-02-3</b>	Surficial geologic map of the Des Moines Lobe of Iowa, Phase 4: Humboldt County, D. J. Quade, J. D. Giglierano, E. A. Bettis III, and R. J. Wisner, 2002, scale 1:100,000, supported by Cooperative Agreement 010-HQAG-0091, September 2002. <a href="#">[Pdf]</a> <a href="#">[Map discussion]</a>
<b>OFM-03-3</b>	Surficial geologic map of the Des Moines Lobe of Iowa, Phase 5: Polk County, D. J. Quade, J. D. Giglierano, E. A. Bettis III, and J. A. Artz, 2003, scale 1:100,000, supported by Cooperative Agreement 02-HQAG-0034, September 2003. <a href="#">[Pdf]</a>

### **Updates to Prior Newsletters**

From time to time, Chris and Andy will include updates regarding past newsletters. One can observe the archived newsletters by navigating to the Natural Resources GIS Library at <http://www.igsb.uiowa.edu/nrgislibx/> and selecting “Archives” next to the current “Newsletter” link found under the heading “About the NRGIS Library”.

### **Newsletter Volume 2: Aerial Photography Captured in the 1970’s Soon Available on the NRGIS Library**

The aerial photos are not up on the library yet; the metadata is yet to be completed. However, the following map illustrates the areas that have been recently georeferenced. As stated in the second newsletter, contact Andy Asell at 319-335-1578 or by e-mail at [aasell@igsb.uiowa](mailto:aasell@igsb.uiowa) for data requests regarding this issue.



### Newsletter Volume 3: Revision of Bedrock Geology Nears Completion

The final map of Southeast Iowa's Bedrock Geology has been sent to USGS. The PDF version of this map should be placed in the on-line publications room by October 11<sup>th</sup>. One can periodically check on the map's status by:

- Navigate from the IowaDNR Geological Survey Homepage (<http://www.igsb.uiowa.edu/>) and select the "Publications, Maps, and Images" link found on the left hand side of the site under "Information Services" or select this link <http://www.igsb.uiowa.edu/service/pubs.htm>.
- On the following page Select "List of Publications",
- Under the category "Select complete catalog listing or select by category:" choose "Open File Maps (digital maps)", and then hit the "Get Listing" button.

Once on-line, you will find the PDF version to be one of the last two publications found at the bottom of the list.

#### Other Updates

Since April, our NRGIS Librarian, Casey Kohrt, has been keeping an on-line listing of updates, deletions, and additions on the NRGIS Library. If you know of a dataset that we are working on or updating or can't find a dataset you know "was here yesterday", try checking on its status by navigating to the NRGIS Library at <http://www.igsb.uiowa.edu/nrgislibx/> and select the link called "Updates" found under the heading "About the NRGIS Library".

